

CHAPTER 1

INTRODUCTION

1.1 BACKGROUND OF STUDY

Formerly, drying clothes usually use natural way by using the energy from the sunlight and the wind, but nowadays the technology is plentifully developed upward and the clothes dryers that use the electric energy or other energy come to use extensively, especially in the urban area (Suntivarakorn et al., 2009) where limited sunlight (cloudy days) and restricted air flow for house types such as high rise condominiums and apartments, natural drying is prohibited in some housing areas for aesthetic reasons and conventional domestic electric dryers are too expensive and inefficient (Mahlia et al., 2010).

Decreasing energy losses and heat recovery are important research topics, nowadays. Many cabinet dryers widely use, especially those who are busy working. Besides that, most of laundries today have their own dryer cabinet. It is not just because to run their operation at all the time, but they also can prevent the risk to the cloths that might lose or dirty. Cabinet dryer on the market nowadays is using electrical power as a source in generating heat. The other alternative of heat source that can be used for drying machine is heat waste.

Heat waste is the capture of energy contained in fluids or gases that would otherwise be lost from a facility. Heat sources may include heat pumps, chillers, steam condensate lines, hot air associated with kitchen and laundry facilities, power-generation

equipment (such as micro turbines or fuel cells), and wastewater drain lines. There are two basic requirements for heat waste;

- i. Heat waste demand must be great enough to justify equipment and maintenance costs.
- ii. The heat waste temperature must be high enough to serve as a useful heat source.

Large facilities such as hospitals and military bases often have the perfect mix of heat waste and demand for clothes dryer to effectively use heat waste recovery for clothes dryers. Also large quantities of hot flues are generated from boilers, kilns, oven and furnaces. If some of the heat waste could be recovered then a considerable amount of primary fuel could be saved. However, the limited sources for the study is only heat waste from the residential such as wood, kitchen stove, natural gas, residential refrigerators and air conditioning. The study will continue with the heat waste from residential and adopting the following measures as outlined in this study.

1.2 PROBLEM STATEMENT

Design and analyze the clothes dryer machine using heat waste normally include an exploration on starting and growing a study about the clothes dryer machine and heat waste. The elements that need to be considered are evaluating heat waste, and developing new products and parcel of most designs and analyze clothes dryer machine. The design must be considerate on the economic, ergonomic and environmentally friendly. There are also must be energy efficient and less power consumption.

Currently, power consumption becomes an important issue addressed by our government. They focused more on energy efficient and less power consumption. Therefore, the use of electric cloth dryer can be replaced by utilizing other heat source such as heat waste. The relationship between energy efficiency and less power consumption has attracted a lot of interest given. It will focus on energy saving features in

the residential as well as in industrial and commercial sectors. Energy efficiency standards has been implemented as a voluntary basis since 2005.

The increase in energy prices is a reality for Malaysian, but also for many other countries all over the world. Switching to energy saving solutions is the answer for reducing costs and the impacts of the energy sector on the environment. There are also to improve competitiveness of products and services in the global market. Efforts are being made to activate promote the utilization of renewable energy resources. Further applications of new energy sources are planned for the immediate future. Heat waste technologies will be developed with emphasis on utilizing cost effective methods as well as strengthening of the cabinet.

The heat waste means free heat is just being wasted without any benefit. There is badness in releasing heat to the environment that will cause of global warming. This problem can overcome by manipulating the heat waste to flow into a cabinet dryer and remove the moisture from cloths. The heat will cost zero, which mean no energy efficient and less power consumption.

1.3 OBJECTIVES OF STUDY

For the purpose of the study, two objectives have been set up to guide the research. They are as follows;

- i. To design and analyze cloth drying machine by utilizing heat waste.
- ii. To analyze performance of the drying machine.

1.4 SCOPE OF STUDY

In scaling the cloth dryer machine to a correct extent, the study of concept of drying machine (cabinet) that can be utilized waste heat in its operation has been focused on residents. The design of the drying machine must be analyzed using Computational Fluid